

SENSOR CALIBRATION INTER-COMPARISON METHODOLOGIES AND APPLICATIONS TO AVHRR, MODIS, AND VIIRS OBSERVATIONS

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ABSTRACT

As more and more satellite observations become available to the science and user community, their on-orbit calibration accuracy and consistency over time continue to be an important and challenge issue, especially in the reflective solar spectral regions. In recent years, many sensor calibration inter-comparison methodologies have been developed by different groups and applied to a range of satellite observations, aiming to the improvement of satellite instrument calibration accuracy and data quality. This paper provides an overview of different methodologies developed for inter-comparisons of AVHRR and MODIS observations, and extends their applications to the Visible-Infrared Imaging Radiometer Suite (VIIRS) instrument. The first VIIRS was launched on-board the NPP spacecraft on October 28, 2011. The VIIRS, designed with MODIS heritage, collects data in 22 spectral bands from visible (VIS) to long-wave infrared (LWIR). Like both Terra and Aqua MODIS, the VIIRS on-orbit calibration is performed using a set of on-board calibrators (OBC). Methodologies discussed in this paper include the use of well-characterized ground reference targets, near simultaneous nadir overpasses (SNO), lunar observations, and deep convective clouds (DCC). Results from long-term AVHRR and MODIS observations and initial assessment of VIIRS on-orbit calibration are presented. Current uncertainties of different methodologies and potential improvements are also discussed in this paper.